Photo- and Chemotactic Response of Orconectes virilis: Determining the Efficacy of a Positive and Negative Taxis System for Nuisance Crayfish

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Invasive crayfish damage ecosystems and increase costs within aquaculture farms by burrowing themselves underground, creating levees, and physically harming fish by clipping fins, lacerating scales, and consuming fish eggs. Within aquaculture, common methods of crayfish removal include traps and renewal of soil; however, these can be extremely costly in limiting the destruction caused by crayfish. To investigate the potential of using pheromones and chemical cues to deter crayfish, a choice chamber with four chambers was used and filled with different types of pheromone concoctions mixed with sodium alginate and calcium chloride. Orconectes virilis (northern crayfish) were given multiple trials, however the data collected ended in being a type two error. To investigate the potential of creating a luring method for crayfish, a series of tests were conducted using three infrared lights of various wavelengths coupled with side glow fiber optic cables. These tests provided information that female crayfish spent a significant ($p<0.05$) amount of time in the near-infrared wavelengths (650 nm) of light chamber and the male crayfish spent a significant ($p<0.05$) more amount of time in the mid-infrared (980 nm) and near-infrared wavelengths (650 nm) of light chambers. Visible light tests were conducted and found that the Orconectes virilis spent more time in the darkness over visible light. With these positive phototaxis results, traps or shoreline could be lined with this light to capture Orconectes virilis.♀

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